UNITED STATES DATA CENTRE MARKET OVERVIEW

451 Research, LLC.

GLOBAL DATA CENTRE MARKET

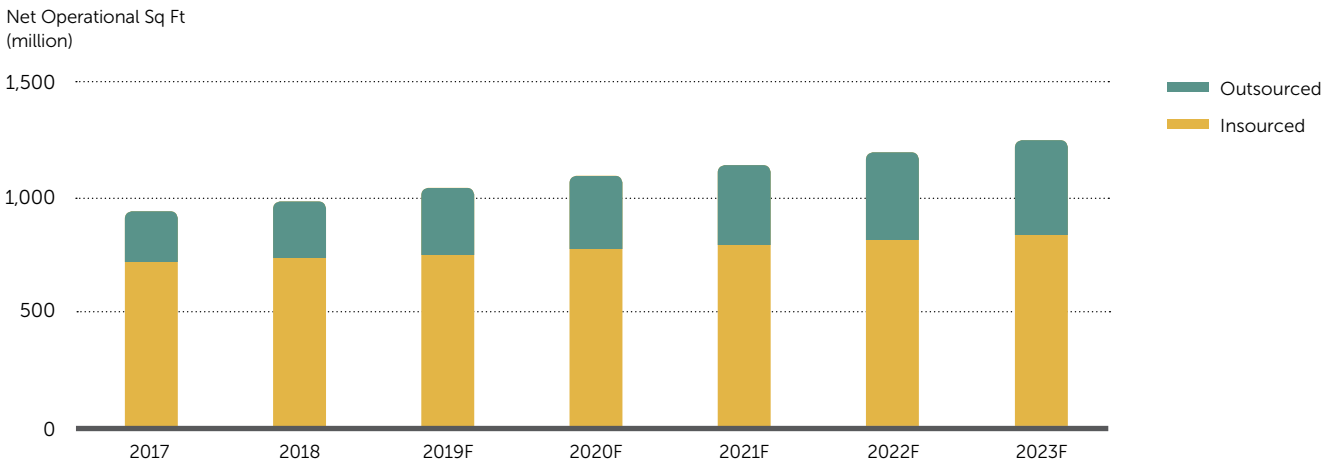
Cloud providers continue to affect the global data centre industry, leasing large amounts of space and power around the world as well as building their own sites. However, cloud providers are not the only ones: content, social media, e-payments, software-as-a-service and other information technology ("IT") firms continue to lease space, as do enterprises as well as government agencies. Leased data centres refer to facilities owned by data centre operators that are leased to a single tenant or to multiple tenants. These do not include facilities owned and operated by enterprises or investors leasing the facilities to enterprises as in-house data centre space.

The global leased data centre market is expected to grow at a compound annual growth rate ("CAGR") of 6.5% from 2017 to 2023F due to various reasons. One is the rapidly increasing amount of data and content as well as the need to house it in secure, resilient locations. In addition, cloud and service providers are under pressure to add data centre space at a very rapid pace in order to keep pace with the growth of cloud computing. In many locations, they lease space in order to achieve their desired timetables. The global market for cloud computing is expected to grow at a CAGR of 16.1% from 2017 to 2023F.

In addition, enterprises are faced with data centres that are obsolete or radically underpowered and need non-capital intensive expansion facilities. Many organisations also seek backup data centres for disaster-recovery and business-continuity purposes, as well as to comply with data sovereignty and other regulations. All of these factors have driven demand for leased data centre space in all regions of the world and this demand is expected to continue unabated. The global market for outsourced data centres is expected to grow at a CAGR of 11.0% from 2017 to 2023F (see Figure 1).

Asia and some areas in Europe are expected to see particularly strong growth due to the rapid uptake of cloud and other IT services. In addition, many countries in Asia and some in Europe have had relatively few leased data centres available and top international cloud providers have not been present there, both of which are changing.

FIGURE 1: WORLDWIDE INSOURCED (ENTERPRISE-USED) AND OUTSOURCED (LEASED & CLOUD PROVIDER-OWNED) DATA CENTRE SPACE



Source: 451 Research LLC., 1Q 2019

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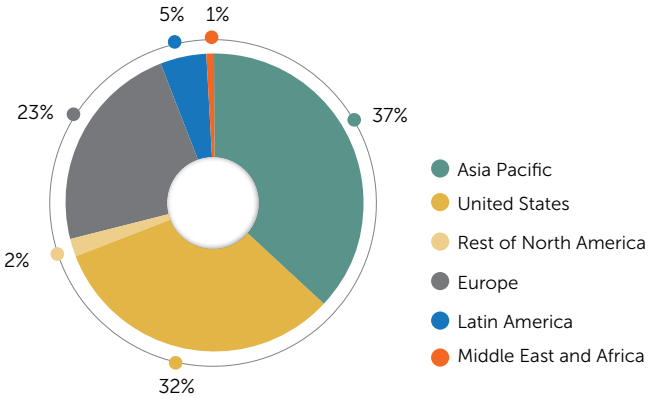
An estimated 74% of global data centre space is in-house data centres used by enterprises. The number of insourced data centres is growing slightly, particularly in countries where there are fewer outsourced options available, for example in smaller countries in Asia, Europe and Latin America. In North America and other advanced data centre markets with plenty of outsourcing options, as enterprises open some facilities, they are often also closing secondary facilities due to consolidation and movement of workloads to cloud, colocation or other forms of outsourcing. This keeps the overall amount of insourced space constant or even negative in those countries.

UNITED STATES DATA CENTRE GROWTH AND DEMAND DRIVERS

The United States is the largest data centre market in the world and the most established, representing 32% of the global insourced and outsourced data centre space by operational sq ft (see Figure 2). It is also home to the largest single market, Northern Virginia.

FIGURE 2: BREAKDOWN OF INSOURCED AND OUTSOURCED DATA CENTRE SPACE BY REGION
Net Operational Sq Ft



Source: 451 Research LLC., 1Q 2019

The outsourced data centre market is growing for several reasons and its drivers in the United States are similar to those for overall network and IT outsourcing demand. These include:

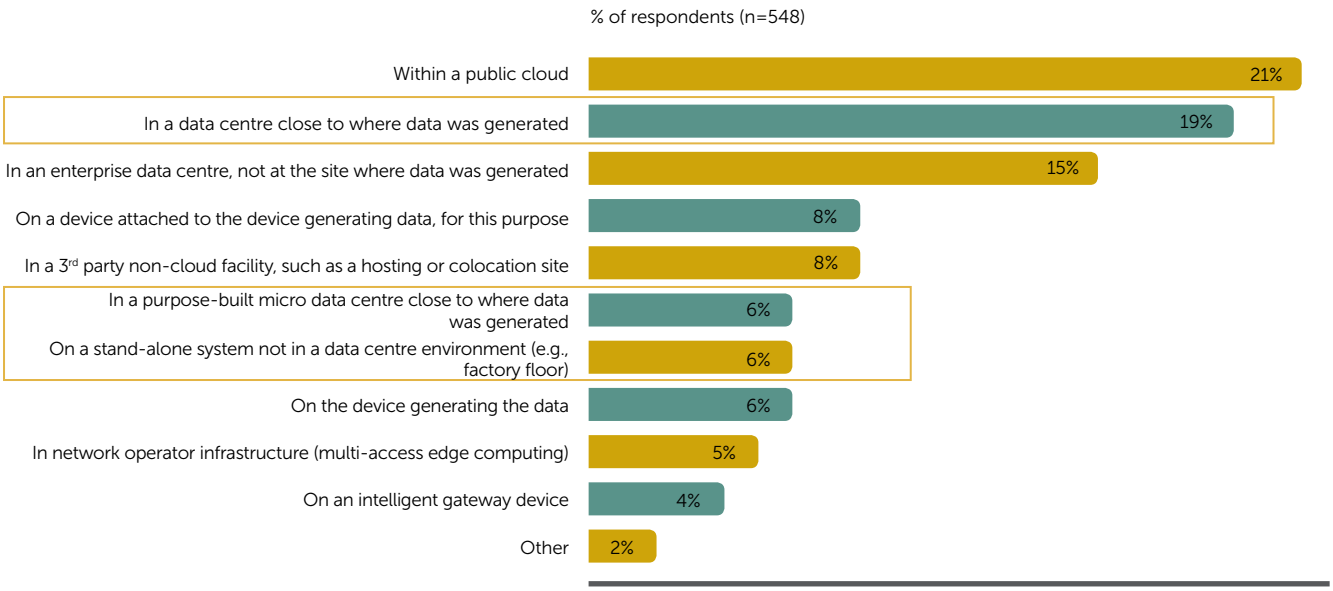
1. **The explosive growth of data and cloud computing and the need for data storage.** Large amounts of data are produced around the world constantly. Many enterprises are required to store data for extended periods. In 2017, Data Center Systems surveyed enterprises and found that unstructured data was growing at 40% to 60% per year. Seagate/IDC have predicted that data created in 2025 (163 zettabytes) will be 10 times the amount created in 2017. Storage growth will continue to be a strong driver of data centre demand.

   In addition, the adoption of web-based applications such as software-as-a-service, platform-as-a-service, infrastructure-as-a-service (cloud computing), video streaming, mobile payments and social media has led to a growing need for data centre space from the providers of those services. These applications require stable, scalable infrastructure in multiple cities in which these service providers operate.

2. **Consumer device proliferation**. The proliferation of new devices fuels consumer demand for application and content delivery, which in turn requires resilient, low-latency Internet Protocol (IP) and cloud infrastructure. According to the Cisco VNI in February 2019, the number of IPv6 capable smartphones and tablets is expected to grow at a CAGR of 18% between 2017 and 2022F.

3. **The need for data to be stored close to its end users.** The rise of the mobile work force and the demand for data and applications to be available on mobile devices have led to a requirement that data and services be available at any time in multiple locations. For many firms, this means that they need to store data close to end users; and, therefore, they require data centre space in multiple locations. In addition, the growth of the Internet of Things and the impending mobile 5G system deployments are expected to boost data centre demand. The Internet of Things will require data centre space in order to store and process data relatively close to where that data is generated – e.g., potentially in or near population centres. Findings from our surveys so far have shown that 19% of data is analysed close to where it is generated and 12% is analysed in a micro data centre or a stand-alone system close to where the data was generated (see Figure 3). The trend of storing data close to where it is generated is expected to grow. Wireless 5G is likely to make accessing data-heavy content such as movies simpler for mobile end users and is expected to drive demand for data centre space in order to store content and provide low latency access to it in population centres.

FIGURE 3: IOT DATA INITIAL STORAGE AND ANALYSIS

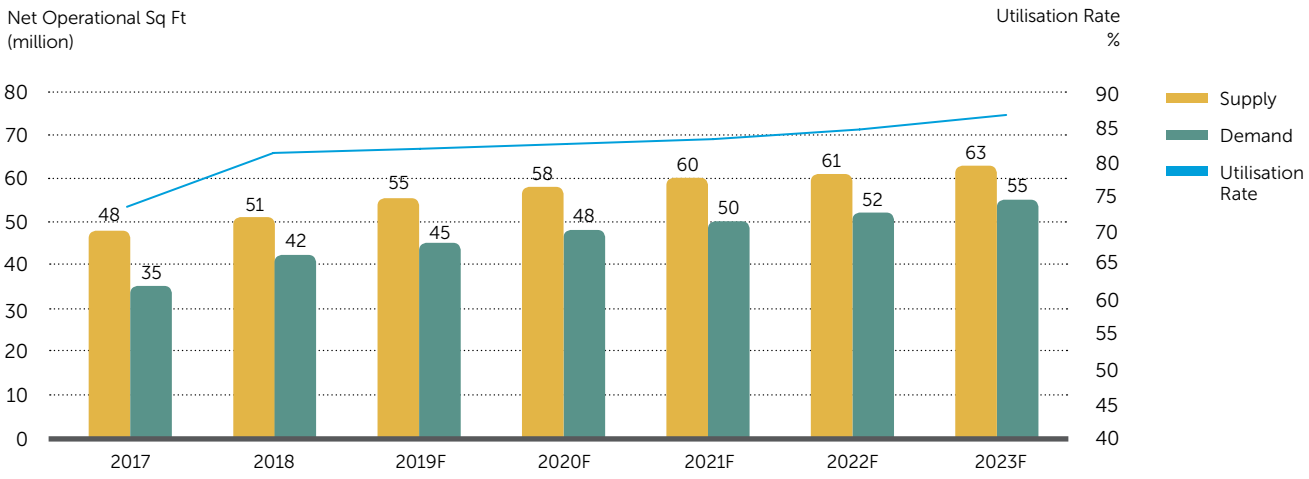


Source: 451 Research LLC., Voice of the Enterprise, Internet of Things, Workloads and Key Projects 2018

4. **The need for geographic diversity and resilience.** To reduce risks from natural disasters, terrorist attacks and accidental outages, firms need backup data centres where data can be duplicated and stored in case a primary data centre experiences an outage.

The United States leased data centre market had an estimated US$14.8 billion in revenue for 2018. This is estimated using the amount of leased space multiplied by the approximate pricing for each city. The growth drivers for leased data centres in the United States are expected to remain strong, underpinning continued demand for data centre space.

FIGURE 4: UNITED STATES LEASED DATA CENTRE SUPPLY AND DEMAND



Source: 451 Research LLC., 1Q 2019

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Leased data centre supply (by net operational sq ft) and demand (by net utilised sq ft) are expected to grow at a CAGR of 4.6% and 7.6% respectively between 2017 and 2023F. Pricing for data centre space has remained fairly stable overall, with prices around 20% lower for large hyperscale clients. However, prices for smaller, older retail colocation space have declined over the past few years because many of these facilities' customers have started using public cloud, shrinking their demand for retail colocation.

KEY DATA CENTRE MARKETS IN THE UNITED STATES

The data centre market in the United States comprises 15 key markets with over one million sq ft of leased data centre space and over a hundred smaller, more locally-focused markets. The 15 key markets are shown (see Figure 5). These markets together account for an estimated 75% of the leased data centre space in the United States. They are key fibre hubs as well as population centres and have seen strong demand for data centre space from public cloud providers, network carriers, social media and content firms, government and enterprises in other verticals. Some of these markets, particularly Northern Virginia, grow at a very large scale. Northern Virginia has seen supply additions of over 800,000 sq ft per year since 2015, sometimes closer to one million sq ft, while Dallas has added over 300,000 sq ft per year. They are expected to continue seeing strong demand.

The key markets are so large partly because over time, enterprises have often placed workloads in the United States regionally. An enterprise typically either owns or leases data centre space in the city where it is headquartered, as well as in at least one other region, either for disaster-recovery purposes or to improve latency for customers/end users in a different part of the country. Enterprises tend to look at the key markets for these regional placements (or at very low-cost rural locations). They are also top markets for insourced data centre space, due to the large concentration of enterprises in these locations.

While secondary markets saw data centre demand mainly from local businesses, they are starting to see more deployments from cloud providers and other firms that are not based locally. In addition, the secondary markets are expected to grow further as the adoption of technologies, such as 5G wireless and Internet of Things, will need data to be stored relatively close to end users around the country, rather than in large regional data centres.

FIGURE 5: TOP 15 MARKETS IN THE UNITED STATES (BY NET OPERATIONAL SQ FT)

Top 15 Markets in the United States
Northern Virginia
New York/New Jersey
Dallas
Silicon Valley
Chicago
Los Angeles
Atlanta
Phoenix
Las Vegas
Boston
Philadelphia
Seattle
Denver
Miami
Houston

Source: 451 Research Datacenter KnowledgeBase, 1Q 2019